EXERCISE REPETITIOUS MOTION COUNTER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims benefit of earlier U.S. Provisional 60/276,039, filed March 16, 2001.

BACKGROUND OF THE INVENTION

This invention relates to motion counters such as those used for counting repetitious motion while exercising. One embodiment of the invention, an exercise motion counter, uses a motion/proximity sensor or detector to keep track of an exerciser's repetitive movements or ``REPS''.

DESCRIPTION OF THE RELATED ART

The prior art includes motion counters that are relative complex and thus do not lend themselves for use by an exerciser in counting REPS.

In the past, exercise counters have primarily measured time as an exercise proxy, e.g., stop-watches. Stop-watches are suitable for exercisers who run for exercise and provide historic run-times that encouraged the runner to beat the previous run-time by running faster.

The prior art also includes pedometers. Pedometers are suitable for both runners and walkers who want to measure or count distances.

There also have been measurement instruments for strength, such as standard weight or resistance belts.

Each of these prior art devices, however, are unsuitable for use by people who exercised by repetitious motion other than using their feet in walking or running, e.g., by sit-ups and push-ups. In the past, when doing such repetitious motion exercises, someone had count (and remember) the REPS manually. Sometimes some other person such as a coach or instructor would count and keep track of REPS.

There have been some electronic devices that assist an exerciser with counting and keeping REPS counts for repetitious exercises such as sit-ups. These devices included foot restraints, pulling devices, and doors for positioning. Other devices would require straps that the person would have to wear or buttons that they would have to push, etc. However, these devices are clumsy and too complicated for easy use, and consequently exercisers find them undesirable for continued use.

Therefore, exercisers who need to keep track of their REPS have been at a loss, with no practical and easy device for measuring their exercise.

SUMMARY OF THE INVENTION

The present invention provides an exercise repetitious motion counter that overcomes many of the prior art problems described above. The present invention provides counters that are easy to use; are

small, lightweight, and quiet; may be worn on the exerciser's body or may be placed on a stationary object or surface apart from the exerciser's body; do not require the exerciser pushing, pulling, or lifting a part of the counter; are fully digital and thereby avoid the use of springs, belts, etc.; do not require physical contact with the counter; and do not require to use of a foreign object, such as a door, for use.

The present invention provides an exercise repetitious motion counter using a motion/proximity sensor or detector that, when placed on or near the person exercising, tracks and keeps the person's REPS by the person's body moving into and out of non-contact proximity with the detector.

An object of the present invention is to provide a hands-free, no-contact device that, each time an exercise movement is made, the device senses or detects the exercise movement and counts, displays, and keeps the number of REPS without interaction by the exerciser during repetitious exercise. Thereby, the inventive device frees the exerciser to complete his or her workout without having to worry about holding, pushing or pulling any counting aid.

A further object of the invention is to provide a device that frees the exerciser from having have to count to himself or herself to keep track of the routine's REPS. Advantageously, while exercising, the exerciser can listen to the radio or watch television

without worrying about counting or miscounting repetitions.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the invention will now be described, with reference to the accompanying drawing figures:

Figures 1-3 are front, side, and back views of one embodiment of the invention.

Figures 4-5 show the invention as user by an exerciser doing sit-ups.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the figures, like elements are identified with like element numbers.

Figures 1-3 show an embodiment of the invention in the form of an exercise counter 10. In these figures, element 1 shows a reset button; element 2 is a device display, e.g., an LCD display showing a REPS number and elapsed time; element 3 is a power switch; element 4 is a detection distance setter; element 5 is a motion/proximity sensor or detector, with the drawing showing an exposed portion of the sensor; element 6 is an hinged device easel with slit 7; and element 8 is a battery compartment.

The counter 10 is advantageously built small, lightweight and easy to use. A hard shell case may be used in order to assure the counter 10 is able to withstand mishandling.

The front side (Figure 1) of the counter 10 comprises a control panel including a power switch 3 operatively connected to the remaining electronic elements of the counter 10, an easy to read LCD display 2 (showing REPS count and time elapsed), detection distance setting 4, a motion or proximity sensor 5, and a reset button 1.

The reset button 1 is conventionally connected to the proximity sensor 5 and may be used to stop and restart the proximity sensor 5 for REPS counting. The reset button 1 may also be connected to clock circuitry providing a timer function. The sensor 5 and clock circuitry would be connected to display 2.

The detection distance setting 4 is set by the user, prior to commencing the exercise, to an approximate distance from the sensor 5 to a relevant part of the exerciser's body. That is, to a part of the exerciser's body that will serve as the reference for counting REPS. The detection distance setting 4 provides a detection range sensitivity for the sensor 5.

The sensor 5 includes an exposed portion as shown by Figure 1, through which exposed portion the sensor emits a reflectable signal used to detect the exerciser's movement. The sensor 5 is connected to detection distance setting 4 and has a detection range based on the current setting of the detection distance setting 4. In some embodiments, a self-calibrating sensor obviates the need for detection distance setting 4.

The sensor 5 is a position sensitive sensor (detector) and may utilize infrared, ultrasonic, photoelectric or any other type of signal capable of detecting movement of the exerciser's body in a non-contact, proximity manner by the signal being reflected off the exerciser or a nearby object and then being detected on return to the sensor 5. Self-contained photoelectric sensors such as the PZ-V/M Series of Keyence Corporation of America are suitable. The sensor 5 is selected based on the proximity range for the repetitious motion that is to be counter.

As shown by Figure 2, on the back side of the counter 10 there is an adjustable easel 6 for leaning the counter 10 in various angles when placed on a horizontal surface such as a floor.

The easel 6 is wide enough to provide stability to the counter 10. Optionally, there may be an opened vertical slit 7 on the easel 6 so that the exerciser can attach the counter 10 to a belt or a velcro™ (hook and eye) strap and wear the counter 10 on the exerciser's body. Alternatively, the counter 10 can be attached to some stationary object such as a vertical post.

The counter 10 is powered by a battery 8, e.g., a small rechargeable battery. Referring to Figure 3, the battery may conveniently be housed with the main portion of the counter 10 hidden from view by the easel 6.

Figures 4-5 show the counter 10 in use.

Figure 4 shows the exerciser in a first position 11 to start a sit-up. In this figure, the

counter 10 is placed with a strap near the knee of the exerciser. The counter 10 may be placed at other locations on the exerciser's body or some other place apart from the exerciser, depending on the kind of exercise being performed.

When the counter 10 is powered on, the sensor 5 sends out a signal that will capture a certain angle detection range 9, i.e., a certain amount of distance and angle. If the counter 10 includes a detection distance setting 4, the user sets the angle detection range with detection distance setting 4 based on the proximity point at which the sensor should detect the exerciser's body and count a REPS.

In this startup first position 11 of Figure 4, the sensor 5 will not detect any motion from the exerciser because he or she is not within the angled detection range 9 of the sensor 5. Therefore the display 2 will not show any counting activity.

Figure 5 shows the exerciser starting the exercise routine in a sit-up second position 12. In this sit-up second position 12 the sensor 5 will detect motion from the exerciser because he or she is within the angled detection range 9 of the sensor 5. At this point, the display 2 of the counter 10 will show a first REPS count. Every time the exerciser moves from the first position 11 to the second position 12 to complete a sit-up during the routine, the sensor 5 will detect a REPS and show a further count on the display 2.

The counter 10 will continue to count until the exerciser stops. At the end of the exercise routine, the exerciser can see on the display a REPS count that indicates the number of times they were in the sit-up second position 12.

The exerciser can then power off the counter 10 or reset it for a separate count or a different exercise routine. Depending on the exercise, the exerciser can place the counter 10 on another part of his or her body or on an object or on the floor.

The embodiments of the present invention disclosed herein are understood to be merely exemplary of the invention, which may be embodied in various forms. Therefore the details disclosed herein are not to be interpreted as limiting, but merely as the basis for the claims and as basis for teaching one skilled in the art how to make and/or use the invention.